



Earth Science and Applications from Space Plans for First Meeting

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Coordinator for Roadmap #9

**Presentation to the First Meeting of the NASA
Earth Science and Applications from Space
Strategic Roadmap Committee,**

**Scripps Institution of Oceanography, La Jolla,
California**

January 26, 2005



Earth Science and Applications from Space Strategic Roadmap

- **Title: Earth Science and Applications from Space**
 - **Short Title: “Earth”**
 - **Roadmap #9 or SRM #9**

- **Objective: Research and technology development to**
 - **advance Earth observation from space,**
 - **improve scientific understanding, and**
 - **demonstrate new technologies with the potential to improve future operational systems**



Earth Science and Applications from Space Strategic Roadmap Committee Membership

■ Co-Chairs:

- Orlando Figueroa, NASA Science Mission Directorate, co-chair
- Diane Evans, Jet Propulsion Laboratory, co-chair
- Charles Kennel, Scripps Institution of Oceanography, co-chair

■ Members:

- Waleed Abdalati, Goddard Space Flight Center
- Leopold Andreoli, Northrop Grumman Space Technology
- Walter Brooks, Ames Research Center
- Jack Dangermond, ESRI
- William Gail, Vexcel Corporation
- Colleen Hartman, National Oceanic and Atmospheric Administration
- Christian Kummerow, Colorado State University
- Joyce Penner, University of Michigan
- Douglas Rotman, Lawrence Livermore National Laboratory
- David Siegel, University of California, Santa Barbara
- David Skole, Michigan State University
- Sean Solomon, Carnegie Institution of Washington
- Eric Sanderson, Wildlife Conservation Society
- Victor Zlotnicki, Jet Propulsion Laboratory



Earth Science and Applications from Space Strategic Roadmap Committee Membership

■ Coordinators:

- **Gordon Johnston, Mission Directorate Coordinator, Designated Federal Official**
- **Azita Valinia, Advanced Planning and Systems Integration Coordinator**

■ Liaison Members

- **Roberta Johnson, University Corporation for Atmospheric Research, Liaison to the Education Strategic Roadmap Committee**
- **Joint Subcommittee (approx. 2 members from each) with the Sun-Solar System Connection Strategic Roadmap Committee**

■ Ex Officio Members

- **Jack Kaye, Earth-Sun System Division**
- **Ronald Birk, Earth-Sun System Division**
- **George Komar, Earth Science Technology Office**

■ Staff

- **Tony Freeman, Systems Engineer, Jet Propulsion Laboratory**
- **Additional staff to be identified, working with the inter-center Earth-Sun System Advanced Planning Team**



General Plan for 1st SRM #9 Meeting

- Ask committee members to give their vision of where the Nation should be in 2035, and what NASA's role should be
- Ask committee members to come prepared to discuss the challenges and opportunities they see over the next 30 years
- Based on these discussions, identify
 - key working assumptions,
 - a forecast of significant influences,
 - a list of critical issues, and
 - key objectives derived from the top-level objective for this roadmap.
- Based on the above, identify the implementation stages and a preliminary set of pathways (or pathway options) within each stage for the 2005 to 2035 time-range of the roadmap
- Identify individuals and subcommittees to work out in more detail the pathways, missions, and other material that will need to be presented at the second meeting in March, and assign actions and a schedule to complete this work and report it to the full committee.



National Programs in a Global Context

(Context Discussions on First Three)

Priority	National Programs	International Programs
Vision for Exploration	Understanding the Earth as the foundation for Planetary Exploration and Search for Life	<i>"Pursue opportunities for international participation to support U.S. space exploration goals"</i>
Global Earth Observation	NSTC CENR Interagency Working Group on Earth Observations (IWGEO) Integrated Earth Observation System, 17 Agencies)	Group on Earth Observations (GEO) Global Earth Observation System of Systems (GEOSS) 10-Year Implementation Plan
Climate Change	Climate Change Science Program (CCSP, 13 Agencies) Climate Change Technology Program (CCTP, 12 Agencies)	Intergovernmental Panel on Climate Change (IPCC))
Weather	U.S. Weather Research Program (USWRP, 7 Agencies)	World Meteorological Organization (WMO)
Natural Hazards	NSTC CENR Subcommittee on Natural Disaster Reduction (SNDR, 14 Agencies)	International Strategy for Disaster Reduction
Sustainability	CENR Subcommittee on Ecosystems	World Summit on Sustainable Development (WSSD)
President's Management Agenda : E-Government	Geospatial One-Stop (GOS, 12 Agencies) and the Federal Geographic Data Committee (FGDC, 19 Agencies)	World Summit on the Information Society



SRM #9 Agenda for Wednesday, 1/26/2005

8:00 AM	Welcome	Johnston, Kennel
8:10 AM	Meeting Logistics	SIO TBD
8:20 AM	Co-Chairs' Remarks	Kennel, Figueroa, Evans
8:30 AM	Committee Member Introductions & Vision: Where should the Nation and NASA be in 2035?	Members (5 min. each)
10:00 AM	Break	All
10:30 AM	Context: Earth Science Strategic Planning and the Vision for Space Exploration	Gregory Williams
11:00 AM	Context Discussion	Members
11:30 AM	Context: Earth-Sun System Research and the US Climate Change Science Program	Jack Kaye
12:00 PM	Context Discussion	Members
12:30 PM	Working Lunch: Federal Advisory Committee Act (FACA) Briefing	Diane Rausch
12:45 PM	Working Lunch (cont.): Ethics Briefing	Andrew Falcon
1:30 PM	Context: Earth-Sun System, National Policy Framework and External Constituencies	Ronald Birk
2:00 PM	Context Discussion	Members
2:30 PM	Challenges and Opportunities for the next 30 years of Earth Science and Applications from Space	Members (5 min. each)
3:15 PM	Break	All
3:30 PM	Challenges and Opportunities for Earth Science and Applications from Space (Cont.)	Members (5 min. each)
4:15 PM	General Discussion*	All
4:45 PM	First Day Wrap-Up and Overnight Assignments	Kennel, Figueroa, Evans
5:00 PM	Adjourn	Gordon Johnston



SRM #9 Agenda for Thursday, 1/27/2005

8:00 AM	Welcome	Johnston, Kennel
8:10 AM	Meeting Logistics	SIO TBD
8:20 AM	Co-Chairs' Remarks on Yesterday's Discussions	Kennel, Figueroa, Evans
8:30 AM	NASA APIO Strategic Roadmaps and Integration	Marc Allen
9:30 AM	Background: Technology Planning and Mission Concepts	George Komar
10:00 AM	Break	All
10:30 AM	Background: Staff Ideas on Scenarios, Stages, and Pathways	Anthony Freeman
11:00 AM	Critical Issues and Objectives for NASA Earth Sci. & Appl. from Space	Members (3 min. each)
12:00 PM	Working Lunch: Develop Stages/ Pathways/ Options/ Decisions Points/ Interdependencies	Meet as Sub-groups?
2:00 PM	Committee Consensus on Stages/ Pathways/ Options/ Decisions Points/ Interdependencies	Members
3:00 PM	Break	All
3:30 PM	General Discussion*	All
4:00 PM	Wrap-up, Subgroup Assignments, and Plans for Next Meeting	Kennel, Figueroa, Evans
5:00 PM	Adjourn	Gordon Johnston



Avoiding Boundaries Between Roadmaps #9 & #10

■ Past:

- NASA divided “Earth science” from “space science” based fluid/ gas vs. plasma/ electromagnetic approaches
 - Generally the top of the stratosphere (the stratopause)
 - A break with this artificial boundary could facilitate new insights & approaches

■ Future:

- Roadmap #9 and #10 teams assigned the full scope of the Earth-Sun system associated with its corresponding strategic objective

■ Desired outcome:

- A set of strategic roadmaps with traceability to the agency objectives
 - Identify and prioritize key science activities to meet the objectives
 - Identify areas of shared interest and potential integration

■ Joint #9/#10 Subcommittee to work this issue



Agency Strategic Roadmap Committees

SR-#	Short *	Full Name	Chartered Objective
1	Moon	Robotic and Human Lunar Exploration	Robotic and human exploration of the Moon to further science and to enable sustained human and robotic exploration of Mars and other destinations.
2	Mars	Robotic and Human Exploration of Mars	Exploration of Mars, including robotic exploration of Mars to search for evidence of life, to understand the history of the solar system, and to prepare for future human exploration; human expeditions to Mars after acquiring adequate knowledge about the planet using these robotic missions and after successfully demonstrating sustained human exploration missions to the Moon.
3	Solar System	Solar System Exploration	Robotic exploration across the solar system to search for evidence of life, to understand the history of the solar system, to search for resources, and to support human exploration
4	Earth-like Planets	Search for Earth-Like Planets	Search for Earth-like planets and habitable environments around other stars using advanced telescopes.
5	CEV	Exploration Transportation System	Develop a new launch system and crew exploration vehicle to provide transportation to and beyond low Earth orbit.
6	Space station	International Space Station	Complete assembly of the International Space Station and focus research to support space exploration goals, with emphasis on understanding how the space environment affects human health and capabilities, and developing countermeasures.
7	Shuttle	Space Shuttle	Return the space shuttle to flight, complete assembly of the International Space Station, and safely transition from the Space Shuttle to a new exploration transportation system.
8	Universe	Universe Exploration	Explore the universe to understand its origin, structure, evolution, and destiny.
9	Earth	Earth Science and Applications from Space	Research and technology development to advance Earth observation from space, improve scientific understanding, and demonstrate new technologies with the potential to improve future operational systems.
10	Sun-Solar System	Sun-Solar System Connection	Explore the Sun-Earth system to understand the Sun and its effects on the Earth, the solar system, and the space environmental conditions that will be experienced by human explorers.
11	Aero	Aeronautical Technologies	Advance aeronautical technologies to meet the challenges of next-generation systems in aviation, for civilian and scientific purposes, in our atmosphere and in the atmospheres of other worlds.
12	Education	Education	Use NASA missions and other activities to inspire and motivate the nation's students and teachers, to engage and educate the public, and to advance the nation's scientific and technological capabilities.
13	Nuclear	Nuclear Systems	Utilize nuclear systems for the advancement of space science and exploration.